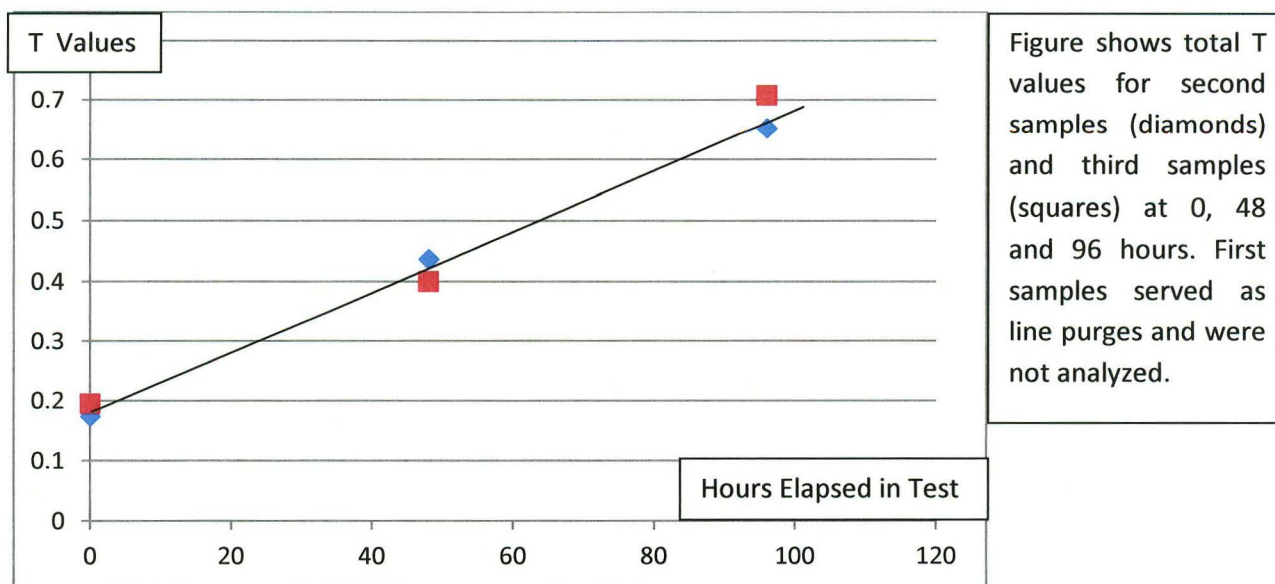




Whole Module Offgas Test Report: Space-X Dragon Module

Between 7 April and 11 April 2012 a chemist from the JSC Toxicology Group acquired samples of air in 500 ml evacuated canisters from the sealed Dragon Module at the Space-X facility at KSC. Three samples were taken of facility air (two before the test and one after the test), and a total of 9 samples were taken from the sealed module in triplicate at the following times: 0 hours, 48 hours, and 96 hours. The module contained 470 kg, which was 100% of the mass to be launched.

Analytical data contained in the Toxicology Group Report (attached) show that the ambient facility air was clean except for almost 9 mg/m³ of isopropanol (IPA) in the sample taken at the end of the test. Space-X must ensure that IPA is not introduced into the module before it is sealed for launch. Other minor contaminants in the ambient air included the following: perfluoro(2-methyl)pentane and hexamethylcyclotrisiloxane. The first-acquired samples of each triplicate from the module were not analyzed. Analyses of pairs of samples that were taken during the test show excellent agreement between the pairs and a linear increase in the T-values during the 4 days of the test (figure below).



The rate of increase averaged 0.124 T units per day. If the time from last purge of the module on the ground to crew first entry on orbit is 10 days, then the T value at first entry should be less than 1.2 units, which is well below the criterion of 3.0 for consideration of additional protection of the crew from offgas products. The primary contributors were as follows: trimethylsilanol (0.057), fluorotrimethylsilane (0.047), acetaldehyde (0.004), hexamethylcyclotrisiloxane (0.003), and toluene (0.002).

19 April 2012

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